ATTACHMENT 7. ECONOMIC ANALYSIS - FLOOD DAMAGE REDUCTION COSTS AND BENEFITS

For the "AttachmentName" in the naming convention of BMS, use "**DReduc**" for this attachment. This attachment will provide estimates for the flood damage reduction benefits of each project in the grant application. See Exhibit C for detailed guidance on the preparation of this attachment.

Note that commitment to providing the flood damage reduction benefits will become a term of the grant agreement if the Proposal is selected for funding.

Exhibit E

This Exhibit provides methods and formats for estimating and presenting, in Attachment 7, the costs and the flood damage reduction benefits of the project. If several projects are being proposed with multiple benefits, then Exhibit F (Proposal Projects and Benefits Summaries) must be completed summarizing the costs and benefits for all projects.

Flood Damage Reduction Benefits may include, but are not limited to, the following benefit types:

Avoided physical damage

Buildings

Contents

Infrastructure

Landscaping

Vehicles

Equipment

Crops

Ecosystems

Avoided loss of functions

NET loss of business income

NET loss of rental income

NET loss of wages

NET loss of public services

NET loss of utility services

Displacement costs of temporary quarters

Transportation system disruptions

Avoided emergency response costs

Evacuation and rescue costs

Security costs

Dewatering, debris removal and cleanup costs

Emergency flood management system repairs

Humanitarian assistance

Avoided public safety and health impacts

Population at risk

Casualties

Displacement/shelter needs

Critical facilities

At a minimum, all applications must provide a narrative description of the expected flood damage reduction benefits of the project. If possible, each such benefit should be quantified and presented in physical or economic terms, using existing information or reasonable effort. If benefits cannot be quantified, explain why and justify. Discussions of public safety benefits should be on a qualitative basis only. Applicants may use the tables contained in this Exhibit to present the flood damage reduction benefits of the project, or may use other formats if desired. Excel spreadsheet versions of following tables can be found at the links listed in the Foreword.

Each applicant must provide the following information:

Narrative description of the project and its relationship to other projects in the Proposal.

The project consists of Phases 2, 3 and 4 of the four-phase Homeland/Romoland Line A Master Drainage Plan (the "Project") and includes approximately 22,000 lineal feet of open channel and storm drains that runs westerly from Juniper Flats Basin to the San Jacinto River. It directly compliments and enhances the benefits from the adjacent, separately funded Phase 1, which includes two detention basins. The Project also includes approximately 16,400 lineal feet of open channel and storm drains that runs westerly from Briggs Basin (part of Phase 1) to the I-215 Freeway. Phase 4 will be constructed by the RCFC & WQD and will serve as part of the Project's local match. The purpose of the Project, as well as the entire MDP, is to collect storm water and control runoff while removing debris, silt and other contaminants and providing a comprehensive solution for non-point source pollution generated from a 6.5 square mile drainage basin. The Project will span portions of the City of Menifee and unincorporated Riverside County, an area generally identified as the Homeland/Romoland communities area, and lies within a 100 year flood zone. There are no other projects in this Proposal.

Narrative description of the project's economic costs.

The estimated capital cost to construct the project is \$16,181,233, which will be incurred between 2011 and 2012 (land acquisition costs incurred in the 4th quarter of 2008). Operation and maintenance costs are estimated to be approximately \$33,000 per year, starting in 2013. The present value costs of the Project, assuming a useful life of 25 years, is \$12,670,368. Furthermore, the net present value of the quantifiable flood prevention benefits over the same useful life is \$92,847,195. Therefore, the cost benefit ratio of the Project, in terms of quantifiable flood prevention benefits, is 7.33:1.

Cost details for the project using Table 10 and the information in Table 6 (Budget).

Cost details are as described in Table 6 and the Budget narrative included within Attachment 4.

Narrative description of all of the project's expected flood damage reduction benefits, which shall address the following items:

Estimates of historical flood damage data,

The City of Menifee was established in 2008, so no official records of historical flood damage are available. However, there was a 2-year storm event within the floodplain in 2009 that caused the flooding of approximately 40 homes, evacuation of residents using four-wheel drive emergency vehicles and the closure of many flooded streets. Public Works cleanup activities continued for several months including restoring culverts and streets washed out during the storm. Additionally, the runoff from the mountains can flood much of the lower alluvial floodplain, as was evident in the relatively moderate storms in 2010-2011, which resulted in a number of road closures and evacuations.

Estimates of existing without-project conditions,

Currently the 1,275-acre area to be directly impacted by the Project is subject to periodic flooding, thereby endangering the health, safety and welfare of the existing community and prohibiting future development, which is crucial to the revitalization of the area. A 100-year event would cause widespread damage to homes, businesses, Heritage High School, the Southern California Edison Power Generation Plant, the EMWD treatment plant, and several acres of agricultural land. All of these properties would need to be evacuated and closed for approximately 2 to 4 weeks. Power would be lost for at least a week. Cleanup would require approximately 50 four man crews with dump trucks and front loaders. Highway 75 and Interstate-215 would be shunt down for 2-3 weeks for repairs. One year of crops on the affected agricultural land would be lost. Residents and businesses would temporarily relocate, causing lost mortgage, rent and lease revenues as well as wages. Contaminated flood waters would spill into the San Joaquin River, contaminating both Canyon Lake and Lake Elsinore.

Estimates of existing with-project conditions,

Phase 1 will reduce the effective storm at the outlet of the Briggs Basin from a 100 year flow to a 25 year flow. Downstream of the basin the effects of the 100 year storm on the downstream tributary area will steadily increase. This Project will safely transmit the discharge of the detention basins along with all other accumulated 100 year storm flows on the remainder of the downstream basin. The Project will take the High School, the Southern California Edison Power Generation Plant and the EMWD treatment plant out of the Q100 Flood plain. In the process of detaining the storm water flows and channelizing the runoff, the Project will remove silt and debris and minimize the amounts of nitrogen, phosphorus and other chemicals that would otherwise be included in the runoff that would have flooded local farm fields

Description of methods used to estimate without- and with-project conditions,

The majority of flood damage estimates are based on the estimated repair and replacement cost impact that 1 foot flood waters would have on a 2,000 square foot home (source: www.floodsmart.gov). The City of Menifee provided additional estimates for commercial, industrial, school, and agricultural property.

The estimated number of homes within the floodplain is based on the number of homes per acre within the City of Menifee as of 2010. All other estimates were derived from the Ethanac Corridor Planning Group Summary Booklet, September 2007 (previously provided to DWR) and information provided by the City of Menifee regarding specific buildings and facilities.

Description of the distribution of local, regional, and statewide benefits, as applicable,

The mitigation of flood impacts described above will primarily benefit local residents and businesses. However, effects resulting from the contamination of Canyon Lake, Lake Elsinore and drinking water supplies of Eastern Municipal Water District (EMWD) would affect all nearby communities within a 5-mile radius, as well as all EMWD rate payers. The closure of I-215 and Highway 74 would affect all residents and businesses within Riverside County who utilize those major transportation corridors. The closure of I-215 would force Riverside County north-south traffic on to the I-15 resulting in major traffic jams affecting surrounding counties. It would affect emergency response time and the ability to move resources to problem areas.

Identification of beneficiaries,

Residents and businesses within the City of Menifee, all EMWD rate payers, all residents of Riverside County who require the use of I-215 and highway 74, and San Bernardino, San Diego and Orange counties who have a threat to their mobility removed.

When the benefits will be received,

Benefits will be received as of the completion date of the Project.

Uncertainty of the benefits, and

The benefits were calculated based on a 100-year storm event. The benefits will be proportional to the level of storms that occur. Storms tend to follow the predictable path, but there will be variation.

Description of any adverse effects.

There will be no adverse effects other than short term local traffic inconvenience and construction noise. These issues were addressed in the CEQA documents.

Narrative discussion that describes, qualifies, and supports the values entered in the tables.

Project cost estimates contained in Table 10 are equal to those provided in the Water Supply Economic Analysis (see Attachment 8).

Estimates of without project flood damages (Table 11) are based on the FEMA Class 1 Floodplain map for a 10-year, 50-year, and 100-year storm and limited historical data related to a recent 2-year storm within the floodplain.

With-Project damage estimates are also based on the projected flows provided by the Project engineer and the City of Menifee.

If possible, quantify estimates of economic flood damage reduction benefits using Table 12 as applicable.

Assuming a useful life of 25 years for the flood control facilities described in this application and a discount rate of 6%, the present value of estimated flood control benefits is equal to approximately \$92,847,195.

Documentation to support information presented in the project(s), including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed.

See Floodplain Diagrams (Exhibit A to Attachment 7), EMWD groundwater management plan (previously provided to DWR), and Ethanac Corridor Planning Group Summary Booklet, September 2007 (previously provided to DWR).

Applicants should take necessary care to provide realistic and supportable cost and benefits analyses. Other studies or documents used to support cost and benefit estimates should be clearly referenced. See Section V, Application Instructions for guidance on submitting studies, documents, or other reference materials. Other types of project benefits (such as water quality, ecosystem restoration, recreation, etc.) should be described in Attachment9: Water Quality and Other Expected Benefits.

Project Costs

This section provides guidance for describing all costs that will be incurred to implement and operate the project and to achieve benefits from the project. This includes costs funded by local, State, and federal agencies, non-profit organizations, and other entities. All costs, both initial investments and operational costs, associated with the project necessary to accomplish full implementation of the project and achievement of the stated benefits, must be included. All costs must be clearly documented to allow a reviewer to assess the accuracy and reasonableness of the analysis. If the reviewers find that some project costs are not included in the analysis, a lower score will result. Applicants must use the following guidelines and assumptions in an economic analysis for the project:

Consistency – The economic analysis must be completed for the entire project and must be consistent with other data and information provided in the project.

With-Project and Without-Project Comparison – The economic analysis should be based on a comparison of expected conditions with- and without-project over the period of analysis.

Period of Analysis – The economic analysis will be based on a project life cycle specified by the applicant which shall include the construction period and operational life.

Economic Cost – Any costs associated with the project, regardless of who bears the cost and regardless of the funding source is considered an economic cost. Opportunity costs should be included, but sunk costs should be excluded.

Sunk Costs – Sunk costs are costs spent in the past that have no salvage value; therefore, they cannot be recovered and should not be counted.

Opportunity Costs – Opportunity cost is the benefit that a resource could provide in the without-project condition and should be counted. For example, land already purchased for use in a project could be used for other purposes; therefore, a reasonable estimate of the market value of that land should be included as a cost. Note that any expenditure paid for an asset before September 30, 2008 cannot be included in Table 6 presented in Attachment 4, because it is not eligible for reimbursement. However, the current value of the asset should be included here as an economic cost.

Discount Rate and Dollar Value Base Year – Please refer to Exhibit C, Table 8 and Table 9 for guidance and the appropriate factors.

Table 10

The project costs presented in this section must be consistent with Table 6 presented in Attachment 4 (Exhibit B) of the grant application. Table 10 may augment initial costs from Table 6 if there are costs, such as opportunity costs, that are not eligible for reimbursement under this grant program. Note that cost savings realized as a result of the project should be included as a benefit and not subtracted from the costs. To complete Table 10, the applicant should use the following steps:

Modify the number of rows to match the estimated project life, i.e. how long the project is intended to operate and provide benefits.

Columns (a) through (f): Enter costs for each applicable cost category in each year of the project's lifecycle. Enter costs beginning in the first year of expenditure, not the first year of operation.

Column (g): Enter the sum of all costs for the year (Columns (a) through (f)).

Column (h): These are the discount factors provided in Table 8.

Column (i): Enter the result of multiplying Column (g) by the discount factor in Column (h) for each year.

Bottom of Column (i): Total Present Value of Discounted Costs: Enter the sum of the Column (i) entries in the last row at the bottom of the table. This is the total present value of all costs discounted at 6%. For each project, these costs must be transferred to Table 20, column (c) in Exhibit F: Proposal Costs and Benefits Summaries.

Comment Box: Enter any sources and references; include page numbers, supporting the numbers used in this table.

Table 10 - Annual Cost of Project (Refer to Attached)

Project Benefits

This section provides guidance for displaying and describing the physical and economic flood damage reduction benefits of the project.

Benefits Analysis

The estimation of flood damage reduction benefits for IRWM Implementation projects is similar to methods used for other flood risk management programs; namely, the estimation of potential flood damage expected to occur over an analysis period for without-project conditions which is compared to consequences expected to occur with a proposed project. The reduction in flood losses attributable to a project are its benefits which can then be compared to project costs to determine if the project is economically justified. Flood damage and other flood-related losses can be expressed as either event or expected annual damage. Event damage results from specific flood events (for example., 10-, 20-, 50-, and 100-year); event damage estimates are useful for characterizing damage potential from specific magnitude storms and associated emergency planning purposes and are input into expected annual damage calculations. Expected annual damage (EAD) is the damage that could be expected to occur in any given year taking into account all types of flood events. Differences in the total present value of EAD between without- and with-project conditions over the project life cycle provide an estimate of the benefits which are then compared to the total present value of costs of the proposed project to determine net benefits or a benefit-cost ratio.

Steps to Determine Flood Damage Reduction Benefits

The general steps for determining flood damage reduction benefits for proposed IRWM Implementation projects are:

Identify at least three flood events for which flood conditions and associated flood damage will be different for without- and with-project conditions;

Identify existing without-project conditions 1:

Determine area affected by flooding for the identified flood events;

Estimate number and values of structures affected by flooding by each event;

If flood management structures are present (such as levees, culverts, etc.), determine probability of failure by event; and

Estimate flood damage for without-project conditions for each event.

Identify existing and future with-project conditions 2:

Determine area affected by flooding for the identified flood events;

Estimate number of and values structures affected by flooding by each event;

If flood management structures are present (such as levees, culverts, etc.), determine probability of failure by event; and

Estimate flood damage for with-project conditions for each event.

Calculate expected annual flood damage as described below for without- and with-project conditions; and

Calculate the expected annual flood damage reduction benefit as described below.

1 Without-project conditions will be assessed based only upon existing conditions; future growth without the project should be excluded from the analysis. Although this greatly simplifies the analysis, it avoids having to determine if future growth meets the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP) building elevation/flood proofing requirements.

2 With-project conditions will be assessed based only upon existing conditions; future growth with the project should be excluded from the analysis. Although this greatly simplifies the analysis, it avoids having to determine if future growth meets FEMA NFIP building elevation/flood proofing requirements. It also avoids the situation where a project may induce growth that would have otherwise not occurred. Such benefits are termed "location" benefits which may occur, but it is the intention of DWR to fund only projects protecting existing development and not future development. Therefore, plans formulated to produce primarily land development opportunities do not reduce actual flood damage and will not be funded by the State.

Calculating Expected Annual Damage

EAD must be calculated for the without-project and the with-project conditions. EAD is a function of three variables:

The probability of an event occurring that could result in flooding;

The probability that, if present, any flood management structures (such as a levee or culvert) fail given the event's occurrence; and

The resulting damage if the flood management structural protection fails.

Table 11 and Figure 1 below provide an example of how to estimate EAD for the without-project and with-project conditions using the FRAM Model. Table 11 identifies five hydrologic events that could result in flooding for an area with some form of structural flood protection (levee, culvert, etc.). The probability of an event resulting in flooding depends on the without- and with-project level of protection provided by flood protection structures (if present). As shown in Table 11, there is a 50 percent chance that a 10-year event will result in flooding without the project because of structural failure. With the project, the structure is improved (or replaced) and the probability of structural failure for all events through year 20 is reduced to zero. Event damage equals the monetary damage if the structure fails multiplied by the probability that the structure will fail for this event. In this example, event damage is greater for the without-project condition than for the with-project condition for all events through year 20. Loss-probability curves are generated by plotting event damage for the without-and with-project conditions compared with the corresponding event probability, as in Figure 1. The area under a loss-probability curve equals the EAD from flooding. In this example, EAD is greater for the without-project condition than the with-project condition and the area between the two curves represents the benefits of the project.

The estimation of EAD requires significant hydrologic, hydraulic, engineering/geotechnical (if levees or other structures are involved) and economics data which must be analyzed to produce the loss-probability curves shown in Figure 1. EAD is the area under the loss-probability curves which requires integration. Computer models are available to assist with these calculations, which range in complexity from the U.S. Army Corps of Engineers' HEC-Flood Damage Assessment which incorporates risk and uncertainty, as well as simpler spreadsheet tools such as the Flood Rapid Assessment Model (FRAM) developed for DWR and the Benefit Cost Analysis (BCA) software developed by FEMA for its own mitigation programs. These models are described in DWR's Draft Economic Analysis Guidelines for Flood Risk Management. To obtain the FRAM, contact DWR at the number provided in the Foreword.

Table 11 - Event Damage (Refer to Attached)

Calculating Total Present Value of Expected Annual Damage Benefits

The expected annual benefit of the IRWM Implementation project equals the difference between EAD withoutand with- the project for one year. Table 12 illustrates how to determine the total present value of expected
annual damage over the life cycle of the project. Continuing with the above example, EAD without the project is
\$59,200 and with the project is \$42,000 (integrating the areas under the loss-probability curves shown in Figure
1); therefore the expected annual benefit is \$17,200. This value is multiplied by the appropriate present value
coefficient for the project's life cycle at a 6% discount rate (this example uses 15.76 which assumes a 50 year
period) which results in a total present value of \$271,100. This value is transferred to Table 20, column (e), Exhibit
F: Proposal Costs and Benefits Summary.

Table 12 - Present Value of Expected Annual Damage Benefits (Refer to Attached)

Other Flood Damage Reduction Benefits

The above discussion of flood damage reduction benefits focused upon physical tangible assets (such as structures) that can be monetarily valued. However, the IRWM Implementation grant may also result other types of flood damage reduction benefits that are just as important but cannot easily be quantified and/or valued monetarily (for example, reductions in the loss of life and other injuries associated with flooding). These types of benefits can be qualitatively described.

Describe Qualitatively: Other Flood Damage Reduction Benefits

A 100-year flood would lessen the quality of life of all residents and employees within the floodplain. Life would not return to pre-flood conditions for one to two years and the associated stigma could last indefinitely.

Seismic Retrofit Projects

The above discussion focuses upon the economic evaluation of projects that mitigate the effects of storm events upon flood management structures. However, the SWFM funding is also available for projects that mitigate the effects of seismic events upon these structures. In many respects, a seismic analysis would be similar to the analyses described above: the estimation of potential flood damage expected to occur over an analysis period for without-project conditions which is compared to consequences expected to occur with a proposed project. For a seismic analysis, some key variables would include:

The probability of a seismic event;

The magnitude of the seismic event;

The timing of the seismic event relative to storm events,

The probability that, if present, any flood management structures (such as a levee or dam) fail given the seismic event's occurrence or thereafter if the structure is weakened and later fails due to a storm event; and

The resulting damage if the flood management structural protection fails.

Because many of these variables can be very difficult to estimate (especially those concerned with seismic probabilities and the probability of structural failures), projects competing for this type of funding will not be required to estimate benefit/cost ratios. However, at a minimum, Table 13 should be completed. FEMA's HAZUS-MH model may be particularly useful for estimating potential damage if GIS-based potential structural failure inundation maps are available.

Table 13 - Minimum Seismic Failure Economics Data (Not Applicable)

Resources

Further information concerning how to conduct flood risk management benefit-cost analyses can be found at:

Department of Water Resources Draft Economic Analysis Guidelines for Flood Risk Management (http://www.water.ca.gov/economics/guidance.cfm)

US Army Corps of Engineers National Economic Development Manuals: http://www.iwr.usace.army.mil/ned/

Table 10 - Annual Cost of Project (All costs should be in 2009 Dollars) Project: Menifee Flood Control Project

	Initial Costs	Operations and Maintenance Costs (1)				Discounting Calculations				
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	
YEAR	Grand Total cost From Table 6	Admin	Operation	Maintenance	Replacement	Other	Total Costs	Update / Discount Factor	Discounted Costs	
	(row (i), column (d))						003.3	Discount ractor		
							(a) ++ (f)		(a) x (h)	
2008	\$2,000,000	\$0	\$0	\$0	\$0	\$0	\$2,000,000	1.010	\$2,020,000	
2009	\$0	\$0	\$0	\$0	\$0	\$0	\$0	1.000	\$0	
2010	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.943	\$0	
2011	\$1,528,612	\$0	\$0	\$0	\$0	\$0	\$1,528,612	0.890	\$1,360,460	
2012	\$12,625,455	\$0	\$0	\$0	\$0	\$0	\$12,625,455	0.840	\$10,600,575	
2013	\$27,166	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$90,166	0.792	\$71,420	
2014	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.747	\$47,077	
2015	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.705	\$44,413	
2016	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.665	\$41,899	
2017	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.627	\$39,527	
2018	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.592	\$37,290	
2019	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.558	\$35,179	
2020	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.527	\$33,188	
2021	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.497	\$31,309	
2022	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.469	\$29,537	
2023	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.442	\$27,865	
2024	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.417	\$26,288	
2025	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.394	\$24,800	
2026	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.371	\$23,396	
2027	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.350	\$22,072	
2028	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.331	\$20,822	
2029	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.312	\$19,644	
2030	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.294	\$18,532	
2031	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.278	\$17,483	
2032	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.262	\$16,493	
2033	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.247	\$15,560	
2034	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.233	\$14,679	
2035	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.220	\$13,848	
2036	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.207	\$13,064	
2037	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.196	\$12,325	
2038	\$0	\$10,000	\$8,000	\$25,000	\$20,000	\$0	\$63,000	0.185	\$11,627	
Total Present Value of Discounted Costs (Sum of Column (i))									\$12,670,368	

Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries

(1) The incremental change in O&M costs attributable to the project.

Comments:

Table 11 - Event Damage																
Event Acres Flooded 1 Homes Flooded		looded	SF of		Acres of Agricultural Land		Building and Agricultural		Public Infrastructure		Event Damage		Event			
Hydrologic	Probability					Commercial/Industrial/High School Property Flooded		Flooded		Restoration Estimates ²		Restoration Estimates ³				D 61
Event						School Prope										Benefit
		Without Project	With	Without Project	With	Without Project	With	Without Project	With	Without Project	With	Without Project	With	Without Project	With	(Million \$)
			Project		Project		Project		Project		Project		Project		Project	
(a)	(b)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(I)	(m)	(n)	(o)	(p)	(p)	(r)	(s)
														(m) + (o)	(n) + (p)	(q) – (r)
2-Year	0.400	19.0	0.0	15	0	35,675	0	4.7	0.0	\$2,552,542	\$0	\$38,095	\$0	\$2,552,542	\$0	\$2,552,542
10-Year	0.080	455.0	0.0	367	0	852,187	0	112.2	0.0	\$60,973,853	\$0	\$143,516	\$0	\$60,973,853	\$0	\$60,973,853
50-Year	0.010	484.0	0.0	390	0	906,502	0	119.4	0.0	\$64,860,099	\$0	\$152,098	\$0	\$64,860,099	\$0	\$64,860,099
100-Year	0.010	534.0	0.0	431	0	1,000,149	0	131.7	0.0	\$71,560,522	\$0	\$190,476	\$0	\$71,560,522	\$0	\$71,560,522
											Ann	ual Expected Va	lues	\$7,263,131	\$0	\$7,263,131

^{1:} Acreage for 2-year, 10-year, 50-year, and 100-year flood without-project based on historical flooding and attached FEMA maps provided by Project engineer.

^{2:} Damage estimated to be \$50,000 per home (Source: FEMA), \$50 per square foot of Commercial/Industrial/School property (Source: City of Menifee), and \$100 per acre of agricultural land (Source: City of Menifee)

^{3:} Source: City of Menifee

Table 12 - Present Value of Expected Annual Damage Benefits Project: Menifee Flood Control Project							
(a)	Expected Annual Damage Without Project (1)		\$7,263,131				
(b)	Expected Annual Damage With Project (1)		\$0				
(c)	Expected Annual Damage Benefit	(a) – (b)	\$7,263,131				
(d)	Present Value Coefficient (2)		12.78				
(e)	Present Value of Future Benefits Transfer to Table 20, column (e), Exhibit F: Proposal Costs and Benefits Summaries.	(c) x (d)	\$92,847,195				

⁽¹⁾ This program assumes no population growth thus EAD will be constant over analysis period.

^{(2) 6%} discount rate; 25-year analysis period (could vary depending upon life cycle of project).

^{*} Estimated by DWR Flood Rapid Assessment Model (FRAM) or other method.

Table 13 - Minimum Seismic Failure Economics Data Project: Menifee Flood Control Project						
Variables Without Project With Project						
Earthquake magnitude which causes structural failure (1)	NA	NA				
Estimated probability of seismic event causing structural failure (1)	NA	NA				
Potential inundation damage (1)	NA	NA				

⁽¹⁾ A seismic study has not been completed for the Project.

EXHIBIT A

FLOODPLAIN MAPS



